

Articles

Basic Demographic and Professional Characteristics of US Women Physicians

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Women physicians are a rapidly growing percentage of the physician population in the United States; yet, their fundamental characteristics are largely unknown. The Women Physicians' Health Study is the first large, national study of US women physicians, comprising a random sample ($n = 4,501$ respondents) of women physicians aged 30 to 70. Data from the Women Physicians' Health Study showed that African-American and Latina or Hispanic physicians were underrepresented, and Asian-American and foreign-born physicians were overrepresented in proportion to their prevalence in the US female population. Women physicians were more likely to be married and less likely to have never married or to be divorced or widowed than other US women. Younger physicians were more likely to be residency trained and board-certified and to work more hours per week than older physicians. Younger physicians were also less likely to be in solo practice, government work, or inactive; they tended to be concentrated in group or hospital-based practices. We found that although US women physicians have some common characteristics that differentiate them from other US women, their practice and other characteristics vary substantially by age and specialty in ways that have not previously been reported.

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Women are now either a large or a rapidly growing proportion of physicians in many countries around the world.¹⁻⁶ In the United States, women are both a substantial and a growing proportion of physicians. In 1994 women constituted 19.4% of the US physician population and 40.3% of medical school classes; by 2010, women physicians are projected to constitute 29.4% ($n = 198,900$) of US physicians.⁷

Much fruitful research has come from the study of men physicians⁸ and women nurses.⁹⁻¹¹ Few investigations have been done of women physicians, however. With the exception of one large study examining physicians' substance use (which included 960 women respondents),¹² the few US physicians' health studies that included women have typically had fewer than 100 women physicians.¹³ No previous comprehensive surveys have been done of a large sample of US women physicians, and few such have been done in other countries.⁶ The Women Physicians' Health Study (WPHS) is a questionnaire-based study of a random sample of US women physicians (with MD degrees) that examined 716 variables in 4,501 respondents.

Several characteristics in women physicians are worth evaluating; this article from WPHS will describe

their fundamental professional and personal characteristics. We will also determine the homogeneity of these characteristics by age and specialty across the population of women physicians; many of these data, particularly those stratified by age and specialty, have never been published for physicians of either sex.

Subjects and Methods

The design of the WPHS has been more fully described elsewhere.¹³ The WPHS is a cohort study of a stratified random sample of US women physicians. The sampling frame is based on the American Medical Association's (AMA's) Physician Masterfile, a database intended to record all physicians residing in the US and its possessions. Our sampling scheme was stratified by decade of graduation from medical school, with 2,500 women randomly selected from each of the past four decades' graduating classes (1950 through 1989). We allocated equal samples for each decade to oversample older women physicians, a group that would otherwise have been sparsely represented by proportional allocation because of the recent growth in the number of women physicians. We included active, part-time, pro-

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ABBREVIATIONS USED IN TEXT

AMA = American Medical Association
WPHS = Women Physicians' Health Study

professionally inactive, and retired physicians whose masterfile data indicated that they were between the ages of 30 and 70 and were not in residency training programs at the time of the sampling frame construction (September 1993).

Four mailings were sent out. Enrollment was closed in October 1994 (final number, 4,501). OpScan (National Computer Systems, Edine, Minnesota) was used to scan returned survey forms after each questionnaire was visually edited.

Of the possible respondents, an estimated 23% were ineligible to participate because their addresses were wrong or they were men, deceased, living out of the country, or interns or residents. Our response rate is 59% of physicians eligible to participate. The few other large ($n > 500$) studies^{8,12,14-16} of US physicians (primarily or exclusively male) conducted in the past 20 years have used similar methods for determining eligibility and have reported similar response rates—43%,⁸ 47%,¹⁶ 59%,¹² 63%,¹⁵ and 75%.¹⁴

We employed three methods to determine ways in

which respondents and nonrespondents differed. We used our phone survey (comparing our phone-surveyed sample of 200 nonrespondents with all the written survey respondents), the AMA Physician Masterfile (contrasting all respondents with all nonrespondents), and an examination of survey mailing waves (from wave 1 through wave 4) to contrast respondents' and nonrespondents' outcomes for a large number of key variables. Based on these three modes of assessing differences, nonrespondents were less likely than were respondents to be board-certified; they did not have consistent or substantive differences regarding other variables for which we tested, including age, ethnicity, marital status, number of children, alcohol consumption, fat intake, exercise, smoking status, hours worked per week, frequency of being a primary care practitioner, personal income, or percentage actively practicing medicine. Our weighting strategy thereby weighted by decade of graduation (to adjust for our stratified sampling scheme), by decade-specific response rate, and by board-certification status (to adjust for our identified response bias). The analysis weights (within decade) for board-certified and non-board-certified respondents, respectively, are 3.4 and 5.5 (1950s), 9.3 and 17.7 (1960s), 17.9 and 36.5 (1970s), and 28.3 and 63.9 (1980s). This weighting scheme, therefore, permits us to describe accurately the entire population of women physi-

TABLE 1.—Stratified Demographic Data for Women Physicians in the United States*

Decade of Graduation and Specialty	Total Unweighted No. (% Weighted)†	Mean Age, Yr (±SE)‡	Hispanic/Latina, %	African-American, %	Asian-American, %	White/Anglo, %	Other, %	Born Out of USA, %
Total	4,501 (100.0)	42.2 (0.1)	5.1	4.2	12.6	75.3	2.8	23.5
Decade of graduation								
1950-1959	1,043 (5.2)	63.2 (0.1)	4.0	1.7	19.1	73.5	1.6	42.2
1960-1969	987 (13.4)	53.6 (0.1)	3.1	1.3	32.8	58.4	4.5	50.7
1970-1979	1,194 (28.9)	44.1 (0.1)	5.6	4.0	14.2	72.0	4.2	28.1
1980-1989	1,277 (52.6)	36.2 (0.1)	5.4	5.3	6.1	81.5	1.7	13.1
Specialty								
Anesthesiology	274 (5.6)	43.1 (0.6)	4.1	5.2	22.9	64.5	3.3	40.4
Dermatology	95 (1.9)	41.9 (0.8)	1.9	0.6	8.5	88.5	0.6	8.8
Emergency medicine	90 (2.5)	40.4 (0.8)	0.0	3.4	5.8	88.3	2.6	13.3
Family medicine	347 (8.3)	41.4 (0.4)	6.3	4.1	8.1	79.2	2.4	16.9
General internal medicine	470 (12.4)	41.4 (0.4)	3.5	7.2	15.3	72.6	1.5	25.2
General practice	150 (3.7)	46.8 (0.9)	9.2	2.1	26.3	59.4	3.0	41.1
Medicine, subspecialist	337 (8.8)	39.8 (0.4)	6.3	3.2	12.4	77.0	1.1	21.4
Neurology	62 (1.3)	41.6 (1.4)	1.6	2.5	12.0	76.8	7.2	28.1
Ob-Gyn	313 (8.2)	39.7 (0.5)	3.2	5.0	8.2	81.1	2.4	18.4
Ophthalmology	94 (2.6)	40.5 (0.9)	2.5	6.4	7.5	82.8	0.8	5.6
Pathology	229 (3.6)	45.1 (0.7)	4.6	3.1	17.1	72.4	2.7	35.9
Pediatrics	807 (16.4)	42.0 (0.3)	7.7	4.7	14.1	68.2	5.2	25.4
Psychiatry	570 (11.3)	45.2 (0.5)	4.7	3.0	11.8	76.3	4.2	26.0
Public health	82 (1.7)	45.3 (1.2)	6.3	5.7	1.2	86.8	0.0	16.6
Radiology	163 (3.3)	42.1 (0.7)	5.9	1.3	8.8	82.0	1.9	17.7
Surgery, general	42 (1.1)	40.1 (1.4)	1.0	0.0	4.3	94.7	0.0	9.7
Surgery, subspecialist	92 (2.8)	38.6 (0.7)	5.8	4.6	5.1	83.9	0.5	9.0
Other	228 (4.3)	44.1 (0.8)	3.9	2.8	12.7	77.6	3.0	25.8

Ob-Gyn = obstetrics and gynecology, SE = standard error

*The number of respondents answering the questionnaire item regarding age was 4,311; for ethnicity, 4,427; for birthplace, 4,098.

†All presented data in all tables, except for sample sizes, are weighted to reflect the entire population of women physicians.

‡Additional age data were derived from the American Medical Association's Masterfile data ($n = 190$).

TABLE 2.—Family Composition for Women Physicians in the United States*

Decade of Graduation and Specialty	Married, %	Single and Never Married, %	Cohabiting, %	Separated or Divorced, %	Widowed, %	With Any Children, %	Mean No. of Children (\pm SE)
Total	73.2	12.6	3.6	9.4	1.1	69.7	1.6 (0.02)
Decade of graduation							
1950–1959	63.4	10.8	0.7	15.1	10.0	81.0	2.3 (0.1)
1960–1969	74.1	8.9	1.4	13.4	2.2	83.7	2.1 (0.1)
1970–1979	73.1	10.1	3.5	12.0	1.2	76.0	1.7 (0.0)
1980–1989	73.9	15.1	4.5	6.5	0.0	61.7	1.2 (0.0)
Specialty							
Anesthesiology	77.8	9.8	1.4	9.8	1.3	66.4	1.5 (0.1)
Dermatology	81.9	3.5	1.1	12.2	1.3	79.4	1.5 (0.1)
Emergency medicine	60.9	18.8	8.6	11.5	0.2	60.5	1.1 (0.1)
Family medicine	73.1	10.9	4.9	10.2	0.9	70.6	1.7 (0.1)
General internal medicine	74.8	12.5	4.1	7.4	1.3	71.7	1.5 (0.1)
General practice	74.0	8.3	1.1	14.6	2.0	81.6	2.1 (0.1)
Medicine, subspecialist	71.1	15.6	6.8	6.3	0.2	62.3	1.2 (0.1)
Neurology	71.6	12.8	6.5	8.8	0.3	57.3	1.3 (0.2)
Ob-Gyn	77.6	9.8	2.6	8.8	1.1	71.6	1.6 (0.1)
Ophthalmology	77.9	14.5	3.0	4.6	0.0	72.3	1.5 (0.2)
Pathology	77.7	9.4	0.4	9.1	3.4	77.9	1.8 (0.1)
Pediatrics	76.3	13.8	1.7	7.3	0.9	76.9	1.8 (0.1)
Psychiatry	67.2	9.6	6.4	15.0	1.8	67.8	1.5 (0.1)
Public health	68.7	11.5	3.9	15.6	0.4	70.4	1.6 (0.2)
Radiology	76.3	10.6	2.0	9.3	1.8	69.8	1.4 (0.1)
Surgery, general	59.6	21.3	4.0	14.6	0.6	49.5	1.0 (0.2)
Surgery, subspecialist	60.1	27.9	3.4	8.4	0.1	40.8	0.8 (0.1)
Other	70.2	17.4	3.1	7.5	1.8	67.2	1.5 (0.1)

Ob-Gyn = obstetrics and gynecology, SE = standard error

*The number of respondents answering the questionnaire item regarding marital status was 4,391 for percentage with any children and for the number of children was 4,426.

cians who graduated from medical school between 1950 and 1989.

In the questionnaire, age, number of children, and number of hours worked per week were queried as continuous variables. Ethnicity, birthplace, marital status, residency training, board-certification status, practice site, and income were queried as categorical variables. Analyses were performed using SUDAAN (Research Triangle Institute, Research Triangle Park, NC).

Results

African-American and Hispanic-American women were underrepresented and Asian-American women were overrepresented in proportion to their prevalence in the US population¹⁷ (Table 1). The highest prevalence of Hispanic Americans was found in general practice, of African Americans in general medicine, and of Asian Americans in general practice and anesthesiology. Nearly all general surgeons were white. There was a higher proportion of women born outside of the United States than in the general population, particularly among older physicians.¹⁷ General practitioners had the highest percentages of physicians born out of the United States and the highest percentage of Hispanic and Asian Americans.

Women physicians were overall more likely to be married and less likely to be divorced or widowed than women in the general population¹⁷ (Table 2). Dermatologists were most likely to be married. Emergency physicians and sur-

geons were least likely to be married and most likely never to have married. Surgeons also were least likely to have any children and had the fewest children.

Younger physicians were more likely to be residency trained (Table 3) and to have board certification—although those who graduated in the 1980s may not yet have had the opportunity to become certified. Younger physicians also worked more hours per week; this was the case both when inactive practitioners were included in (not shown) and excluded from calculations of means. With the exception of emergency physicians and general practitioners, nearly all specialists reported residency training; general practitioners also reported the lowest prevalence of board certification. Physicians in preventive medicine worked the fewest clinical and the most non-clinical hours,¹⁸ and surgeons worked the most clinical hours and the greatest number of hours overall. Concerning physician income, anesthesiologists, obstetricians, radiologists, and surgical subspecialists had the highest incomes; family practitioners and those in preventive medicine had the lowest. Removing inactive practitioners from the population changed only one median income (not shown): the income of physicians graduating in the 1950s increased to between \$100,000 and less than \$150,000 from \$50,000 to less than \$100,000.

Younger physicians were less likely to be solo practitioners, in government work, or inactive; they tended to be employed in group or hospital-based practices (Table

TABLE 3.—Stratified Training and Practice Characteristics for Women Physicians in the United States*

Decade of Graduation and Specialty	Residency Trained, %	Board Certified, %	\bar{X} Clinical Hours Worked/Wk (\pm SE) [†]	\bar{X} Nonclinical Hours Worked/Wk (\pm SE) [†]	Approximate Mean Income, \$ $\times 10^3$ (\pm SE) [‡]
Total	94.8	64.5	36.8 (0.4)	10.5 (0.3)	109 (1)
Decade of graduation					
1950–1959	88.2	48.6	30.5 (0.6)	11.7 (0.5)	100 (2)
1960–1969	89.1	57.1	35.4 (0.6)	10.4 (0.5)	123 (2)
1970–1979	93.7	72.4	35.5 (0.5)	10.5 (0.4)	119 (2)
1980–1989	97.5	63.6	38.3 (0.6)	10.4 (0.4)	102 (2)
Specialty					
Anesthesiology	98.4	59.5	44.0 (1.6)	7.6 (1.2)	154 (6)
Dermatology	99.4	85.9	31.7 (1.7)	8.6 (1.9)	118 (10)
Emergency medicine	73.1	65.1	37.3 (1.4)	4.6 (0.7)	126 (6)
Family medicine	89.0	80.3	36.7 (0.9)	8.2 (0.6)	83 (3)
General internal medicine	99.2	64.4	37.3 (1.0)	10.0 (0.7)	96 (2)
General practice	43.2	6.8	33.6 (1.5)	6.7 (1.1)	70 (4)
Medicine, subspecialist	99.1	74.7	35.1 (1.4)	17.4 (1.1)	100 (4)
Neurology	98.4	72.5	38.7 (2.4)	11.2 (2.0)	101 (7)
Ob-Gyn	99.4	57.0	45.1 (1.5)	7.8 (0.8)	159 (5)
Ophthalmology	98.9	70.5	35.1 (1.5)	6.3 (1.1)	125 (9)
Pathology	97.9	89.8	31.8 (1.1)	14.6 (1.1)	127 (6)
Pediatrics	97.5	73.1	34.9 (0.8)	11.0 (0.6)	90 (2)
Psychiatry	98.4	47.2	33.6 (0.9)	9.2 (0.6)	90 (3)
Public health	90.0	40.3	8.7 (2.1)	30.5 (3.0)	71 (4)
Radiology	99.7	78.9	42.3 (1.2)	5.4 (0.5)	175 (9)
Surgery, general	100.0	64.8	49.2 (2.6)	8.6 (1.8)	127 (11)
Surgery, subspecialist	100.0	61.2	52.3 (2.7)	11.4 (1.3)	148 (8)
Other	93.5	66.1	32.6 (1.7)	14.1 (1.1)	127 (6)

Ob-Gyn = obstetrics and gynecology; SE = standard error

*The number of respondents answering the questionnaire item regarding residency training was 4,469; for board certification, 4,493; for clinical hours worked per week, 4,316; for nonclinical hours worked per week, 4,159; and for personal income, 3,609.

[†]Excludes retirees and inactive practitioners.

[‡]Income is presented as means; the following dollar categories were offered (with midpoints used for calculations): \$0; \$1 to <\$25,000; \$25,000 to <\$50,000; \$50,000 to <\$100,000; \$100,000 to <\$150,000; \$150,000 to <\$200,000; \$200,000 to <\$250,000; \geq \$250,000.

4). Half of obstetrician-gynecologists were in group practices, and dermatologists, ophthalmologists, and psychiatrists were more likely than were other specialists to be in one- or two-physician practices. Surgical and medical subspecialists and neurologists were more likely to be medical school-based, and physicians in preventive medicine were most likely to work for the government.

Discussion

In a substantial number of demographic and other variables, women physicians differed from the general public. Nonetheless, although women physicians have some similarities, they are not homogeneous by age or by specialty.

Overall, a high percentage of physicians in this population self-identified as Asian American, a characteristic particularly noted of general practitioners. The highest prevalence of Asian Americans was in those graduating from medical school in the 1960s; relatively few 1980s graduates were Asian American. There was a low overall prevalence of African- and Hispanic-American physicians, and whereas the percentage of African-American graduates grew over time, the trend was less clear for Hispanic Americans. The percentage of white-American graduates was higher in the 1980s than in any

other decade. This may be a cohort effect, or it may be the effect of more recent international medical graduates not yet having had time to immigrate to the United States. These are the first survey data to be published regarding the racial makeup of US physicians of either sex, and they quantify the extent to which non-Asian minorities have lower representation in the population of US physicians. These data, along with information on racial distributions of current medical students,¹⁹ suggest that US medical schools could further improve the diversity of their classes, and these data will help us track the extent to which this maldistribution improves. We describe the fundamental characteristics of US women physicians in the mid-1990s; further analyses will evaluate the extent to which these findings interact with such variables as age or country of origin.

The observation that women physicians were overall more likely to be married and less likely to be divorced than women in the general population¹⁷ confirms AMA reports.²⁰ Family composition, stratified by specialty and age, of either women or men US physicians has not been previously published. Dermatologists, physicians with a high potential for regular and controllable work hours, were most likely to be married; emergency physicians and surgeons, physicians with often irregular and uncon-

TABLE 4.—Stratified Practice Work-Site Data for Women Physicians in the United States, %*

Decade of Graduation and Specialty	Solo Practice	2-Physician Practice	Group Practice	Hospital	Medical School	Government Facility	Other	Inactive
Total	16.7	6.2	26.4	23.1	10.0	8.8	5.8	2.9
Decade of graduation								
1950–1959	28.2	2.4	9.3	13.9	7.8	12.6	10.2	15.7
1960–1969	26.4	6.0	17.7	17.5	8.4	13.5	7.1	3.2
1970–1979	21.7	6.9	24.0	20.2	10.7	7.7	6.3	2.4
1980–1989	10.4	6.3	31.6	26.9	10.2	7.9	4.8	1.9
Specialty								
Anesthesiology	10.2	0.0	23.7	47.3	10.4	2.1	2.9	3.3
Dermatology	35.4	24.2	24.4	5.9	6.2	2.6	0.0	1.3
Emergency medicine	0.0	0.0	6.4	88.9	0.8	1.3	2.5	0.0
Family medicine	17.3	10.3	40.5	6.9	5.2	5.1	12.0	2.7
General internal medicine	18.9	5.1	34.5	12.1	6.6	12.3	8.4	2.1
General practice	20.4	14.9	16.7	8.3	0.9	22.8	9.1	6.9
Medicine, subspecialist	10.6	3.3	22.8	30.9	18.7	8.7	3.4	1.7
Neurology	15.0	7.3	16.8	30.4	21.1	4.9	0.0	4.5
Ob-Gyn	17.9	8.8	48.9	10.6	9.1	1.7	1.8	1.4
Ophthalmology	26.1	23.9	36.0	2.8	5.5	2.7	1.7	1.3
Pathology	3.0	2.4	13.4	54.7	13.1	7.2	2.8	3.3
Pediatrics	11.3	4.4	32.7	21.0	12.7	8.4	5.8	3.8
Psychiatry	38.1	4.4	4.8	22.9	7.5	12.8	5.3	4.2
Public health	0.0	1.9	4.0	5.6	7.7	60.1	14.4	6.3
Radiology	4.9	1.8	21.4	56.5	6.8	4.7	0.2	3.6
Surgery, general	16.2	8.5	41.9	14.9	10.0	7.6	0.4	0.6
Surgery, subspecialist	15.3	8.8	27.6	16.3	26.9	3.7	1.4	0.0
Other	13.5	7.5	15.4	25.1	12.0	7.7	17.4	1.4

Ob-Gyn = obstetrics and gynecology

*The number of respondents answering the questionnaire item regarding practice work site was 4,439.

trollable hours, were least likely to be married. Surgeons were also less likely to have had children and had the fewest children. We speculate that certain specialties might make the obligations of spouse and family more achievable.

Graduates of the 1950s and 1960s were more likely to have had children and to have had a larger mean number of biological or adopted children or stepchildren. This finding will likely persist even as this sample cohort ages because most of our physicians are past childbearing years. When coupled with our finding that younger physicians also worked more hours (a finding that may or may not be a cohort effect), this provides quantitative confirmation that younger women physicians—like younger women in other populations—may place more emphasis on professional attainment and less on child rearing than did their older colleagues. Subsequent analyses of these data will examine related questions, such as whether younger women physicians also assume fewer domestic responsibilities than do older women physicians.

We found that younger physicians were more likely to be residency trained and to work more clinical hours per week. Older and younger women physicians reported working in very different work sites. Older physicians were more likely to be solo practitioners, in government work, or retired; younger physicians were more likely to be employed in group or hospital settings. These age-related differences could be attributable to changes in spe-

cialty medical education choices or to younger physicians expecting careers spent predominantly in the employ of large companies, including companies that may consider residency training and board certification to be hallmarks of excellence.

Our income and specialty distribution data are similar to those of the AMA,^{7,20} with primary care practitioners reporting the lowest personal incomes. Although women physicians make considerably more money than women or men in the general population, women physicians' incomes are about 62% those of male physicians.⁷ Women physicians have traditionally gone into lower paying specialties in medicine than have men, and they earn only 54% to 83% of same-specialty men's hourly rates (unadjusted for confounders such as age or patients seen per hour).²⁰ It will be interesting to note any changes in gender-based pay disparities as more women enter historically male-dominated medical fields; thus far, pay disparities remain pronounced.²⁰

Many other aspects of women physicians' lives and practices bear examining. We will study these and possible interactions with and confounders and predictors of these fundamental findings in future articles. For now, however, we can say that US women physicians exhibit considerable heterogeneity by age, as well as some heterogeneity by specialty. This age-related heterogeneity is particularly noteworthy, as it may help us predict the character of medicine in the future.

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